

L Number	Hits	Search Text	DB	Time stamp
1	5123	(coke or asphaltene\$3 or petroleum) with (flocculation or precepiat\$4 or "molecular weight")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/03/19 19:25
2	73	((coke or asphaltene\$3 or petroleum) with (flocculation or precepiat\$4 or "molecular weight")) and solvated	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/03/19 19:22
3	1971	((coke or asphaltene\$3 or petroleum) with (flocculation or precepiat\$4 or "molecular weight")) and (solvated or micelles or instability or stability)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/03/19 19:23
4	986	(436/29,31,25,140,163).CCLS.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/03/19 19:25
5	306	((436/29,31,25,140,163).CCLS.) and (coke or asphaltene\$3 or petroleum or oil\$2)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/03/19 19:25

10009863 (PCT44015950)

L1 877 (COKE? OR ASPHALTEN? OR MALTENE?) (5A) SOLVENT?

L2 150 L1 AND PRECIPITAT?

L3 58 L2 AND SOLUB?

L3 ANSWER 1 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:944139 CAPLUS

DOCUMENT NUMBER: 140:44463

TITLE: Regular solution model for asphaltene precipitation from bitumens and solvents

AUTHOR(S): Alboudwarej, Hussein; Akbarzadeh, Kamran; Beck, James; Svrcek, William Y.; Yarranton, Harvey W.

CORPORATE SOURCE: Dept. of Chemical and Petroleum Engineering, The University of Calgary, Calgary, AB, T2N 1N4, Can.

SOURCE: AIChE Journal (2003), 49(11), 2948-2956

CODEN: AICEAC; ISSN: 0001-1541

PUBLISHER: American Institute of Chemical Engineers

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A regular soln. theory liq.-liq. equil. model was developed to predict asphaltene pptn. from Western Canadian bitumens. The input parameters for the model are the mole fraction, molar volume, and soly. parameters for each component. Bitumens were divided into four main pseudo-components corresponding to SARA fractions: sats., aroms., resins, and asphaltenes. Asphaltenes were divided into fractions of different assocd. molar mass based on a Schultz-Zimm molar mass distribution. Asphaltene self-assocn. was accounted for through the av. molar mass of the distribution. The molar volumes and soly. parameters of the pseudo-components were calcd. using soly., d., and molar mass measurements. The model successfully predicted the effect of solvent type and assocd. molar mass on asphaltene pptn. for model oil and n-alkane systems. The model also predicted the onset and amt. of asphaltene pptn. from bitumens.

REFERENCE COUNT: 28

L3 ANSWER 2 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:182704 CAPLUS

TITLE: "Asphaltene solubility and aggregation"

AUTHOR(S): Kilpatrick, Peter K.; Gawrys, Keith L.

CORPORATE SOURCE: Department of Chemical Engineering, North Carolina State University, Raleigh, NC, 27695-7905, USA

SOURCE: Abstracts of Papers, 225th ACS National Meeting, New Orleans, LA, United States, March 23-27, 2003 (2003), GEOC-139. American Chemical Society: Washington, D.C.

CODEN: 69DSA4

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB Asphaltenes are the toluene-sol., heptane or pentane-insol. fraction of petroleum fluids. Asphaltenes are recognized to be remarkably polydisperse in polarity, aromaticity, and chem. functionality, and yet have many universal features: they are strongly surface-active at both oil-water and oil-solid interfaces, they are marginally stable in soln. and are prone to pptn. and deposition, and they aggregate strongly in soln. We have studied the soly. properties of asphaltenes from a variety of crude sources and used the fractional soly. of asphaltenes in model solvents as a means of sepg. asphaltenes into sub-fractions with markedly different properties. We present in this talk "distribution functions" of asphaltene properties based on this differential soly. method, as well as some of the aggregation properties as probed by small angle neutron scattering and vapor pressure osmometry. Our results clearly indicate that the mol. architecture of asphaltenes is one of open inter-connected arom. rings, which helps to explain many of the more recent observations on asphaltenes, in contrast to the oft-cited "island" model in which asphaltenes are depicted as very large fused ring structures.

L3 ANSWER 3 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:928419 CAPLUS

DOCUMENT NUMBER: 138:139807

TITLE: "Reversible Description of Asphaltene Colloidal Association and Precipitation"

AUTHOR(S): *Porte, Gregoire; Zhou, Honggang; Lazzeri, Veronique*

CORPORATE SOURCE: GDPC/CNRS Case 026, Universite Montpellier II, Montpellier, 34095, Fr.

SOURCE: **Langmuir (2003), 19(1), 40-47**

CODEN: LANGD5; ISSN: 0743-7463

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Asphaltenes in crude petroleum and other apolar solvents have soly. properties and indicate colloidal aggregation. However, none of the various literature models proposed so far is capable of accounting consistently for all properties. In this article, the current literature was re-visited and all the reported robust exptl. features of asphaltene solubilization were listed. Then a new description was formulated in which asphaltene aggregation and pptn. were considered distinct steps in a completely reversible process. In this model, aggregation proceeded from specific strong interaction sites located at the periphery of the asphaltene mols. The interaction sites drive the reversible assocn. in two-dimensional sheets, a morphol. that was consistent with reported viscosity and light scattering data. Pptn. eventually occurs, detd. by van der Waals attractions between aggregates, when the soly. parameter of the solvent is shifted. One major interest of this description is that it accounts for the remarkable solubilizing properties of "petroleum resins" within a completely reversible scheme. REFERENCE COUNT: 43

L3 ANSWER 4 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:603474 CAPLUS

DOCUMENT NUMBER: 138:306266

TITLE: An experimental theoretical approach to the activity of amphiphiles as asphaltene stabilizers

AUTHOR(S): Rogel, E.; Contreras, E.; Leon, O.
CORPORATE SOURCE: PDVSA-INTEVEP, Caracas, 1070A, Venez.
SOURCE: Petroleum Science and Technology (2002), 20(7 & 8), 725-739
CODEN: PSTEFV; ISSN: 1091-6466
PUBLISHER: Marcel Dekker, Inc.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The addn. of amphiphiles is one of the most frequent approaches used to prevent asphaltene pptn. in reservoir rocks and wellbore tubing. These substances can solubilize the asphaltenes otherwise insol. under prodn. conditions. The activity of the amphiphiles as asphaltene stabilizers is directly related to the adsorption behavior of the amphiphile on the asphaltene surface. In this study, a semiquant. description of the adsorption behavior of different amphiphiles is carried out using mol. modeling to characterize the mutual interactions between the amphiphile, asphaltene and solvent. At the same time, flocculation onset measurements using n-heptane as a pptg. agent were carried out to evaluate the exptl. activity of the different amphiphiles as asphaltene stabilizers. Two different indexes calcd. using the mutual interaction energies amphiphile-asphaltene-n-heptane were used to correlate them with the exptl. activity shown by the amphiphiles. The results obtained indicate that the activity of the amphiphiles as asphaltene stabilizers increases, as their adsorption on the asphaltene is more favorable. In fact, the net adsorption energies of amphiphiles on asphaltenes from n-heptane can be used as a good criterion for the selection of asphaltene pptn. inhibitors. REFERENCE COUNT: 28

L3 ANSWER 5 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:301152 CAPLUS
DOCUMENT NUMBER: 137:35223
TITLE: Factors Contributing to Petroleum Foaming. 2. Synthetic Crude Oil Systems
AUTHOR(S): Zaki, Nael N.; Poindexter, Michael K.; Kilpatrick, Peter K.
CORPORATE SOURCE: Department of Chemical Engineering, North Carolina State University, Raleigh, NC, 27695, USA
SOURCE: Energy & Fuels (2002), 16(3), 711-717
CODEN: ENFUEM; ISSN: 0887-0624
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The influence of petroleum asphaltenes and resins on stabilizing model oil foams comprised of light mineral oil mixed with toluene (mineral) was investigated. Two factors contribute significantly to foam vol. and stability: bulk viscosity and asphaltene state of aggregation. An increase in bulk viscosity was found to increase foam stability as gauged by the total time required for a foam to collapse. Asphaltene aggregation is governed primarily by the solvent aromaticity and resin/ asphaltene (R/A) ratio. There is a threshold size in the state of asphaltene aggregation above which the ability of these aggregates to stabilize foams is markedly reduced. This appears to be closely related to asphaltene flocculation and pptn. at compns. beyond the soly. limit of the asphaltenes. Solvent systems generating the highest foam vol. were found to reduce the air-oil surface tension to the greatest extent. Addn. of an asphaltene dispersant increased the

foamability of asphaltenes in mineral and seems to indicate that asphaltenes enhance foam stability when they are well dispersed or dissolved and in solvent mixts. in which they are highly surface active. By analogy to the role of asphaltenes in stabilizing emulsions, the highest foam stability was obsd. for asphaltenes near their soly . limit, the thermodyn. state at which asphaltenic aggregates are most surface-active. Addn. of resins, similar to addn. of dispersants, increased foam stability, presumably by decreasing the size of asphaltene aggregates. REFERENCE COUNT: 53

L3 ANSWER 6 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:256844 CAPLUS

DOCUMENT NUMBER: 137:22115

TITLE: Effect of Organic Additives on the Onset of Asphaltene Precipitation

AUTHOR(S): Oh, Kyeongseok; Deo, Milind D.

CORPORATE SOURCE: Department of Chemical and Fuels Engineering, University of Utah, Salt Lake City, UT, 84112, USA

SOURCE: Energy & Fuels (2002), 16(3), 694-699

CODEN: ENFUEM; ISSN: 0887-0624

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The onset of solid pptn. from oils was detd. by identifying the min. in near-IR absorbance. Solvent-induced pptn. typically causes asphaltene pptn., but is also known to cause high-mol.-wt. waxes to come out of soln. The effects of the addn. of solid satd. and unsatd. compds. on the onset of solvent-induced pptn. from a crude oil were examd. Crude oil from Rangely, an oil field in northwestern Colorado was used. The solvent-induced pptn. was brought about using pentane, hexane, and heptane. From limited solvent carbon no. studied (5-7), less solvent was required for pptn. onset as the carbon no. of alkanes decreased. As the flow rate of the precipitant increased, the onset was delayed. Addn. of solid n-alkanes, such as eicosane and tetracosane to the oil initially, accelerated the onset of pptn. When solid polyarom. compds. (naphthalene and phenanthrene) were dissolved in the oil, more solvent was required to initiate onset of pptn. Also the crude oil was considerably undersatd. with respect to the asphaltenes and initial dissoln. of asphaltenes in the oil accelerated the pptn. The data provided insight on soly.-related solids pptn. from oils. REFERENCE COUNT: 25

L3 ANSWER 7 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:212084 CAPLUS

DOCUMENT NUMBER: 136:388198

TITLE: "Solubility/Molecular Structure Relationships of Asphaltenes in Polar and Nonpolar Media"

AUTHOR(S): Buenrostro-Gonzalez, E.; Andersen, S. I.; Garcia-Martinez, J. A.; Lira-Galeana, C.

CORPORATE SOURCE: Thermodynamics Research Laboratory, Branch of Molecular Engineering, Instituto Mexicano del Petroleo, Mexico City, 07730, Mex.

SOURCE: Energy & Fuels (2002), 16(3), 732-741

CODEN: ENFUEM; ISSN: 0887-0624

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Asphaltenes sepd. from a Maya-type crude oil were suspended in toluene and later fractionated by soly. in a polar (acetone) and a nonpolar (n-heptane) pptg. solvent. The two sets of derived fractions were characterized using size exclusion chromatog. (SEC), elemental anal., Fourier transform IR spectroscopy (FTIR), and synchronous fluorescence spectroscopy and proton NMR (¹H NMR) spectroscopy. The acetone- pptd. asphaltene fractions had larger structural differences compared with those pptd. from n-heptane. The av. size of the arom. and aliph.-substitutions regions of each fraction also correlated with asphaltene soly. in such a way that the smaller the arom. region and the larger the aliph. substitutions, the greater the soly. These correlations may provide further explanations as to the role of structural properties on the soly. of asphaltenes in polar and nonpolar media. REFERENCE COUNT: 48

L3 ANSWER 8 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:118943 CAPLUS

DOCUMENT NUMBER: 137:8310

TITLE: "Asphaltene flocculation and collapse from petroleum fluids"

AUTHOR(S): Branco, Valter Antonio M.; Mansoori, G. Ali; Xavier, Luiza Cristina De Almeida; Park, Sang J.; Manafi, Hussain

CORPORATE SOURCE: Cidade Universitaria, Petrobras/CENPES/DIGER, Petroleo Brasileiro S.A., Rio de Janeiro, 21910, Brazil

SOURCE: **Journal of Petroleum Science & Engineering (2001), 32(2-4), 217-230**

CODEN: JPSEE6; ISSN: 0920-4105

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Deposition of complex and heavy org. compds., which exist in petroleum crude and heavy oil, can cause a no. of severe problems. To prevent deposition inside the reservoir, in the well head and inside the transmission lines, it is necessary to be able to predict the onset and amt. of deposition due to various factors. The mechanism of asphaltene deposition, which is the major cause of most org. deposition cases, is modeled based on statistical mechanics of polydisperse polymer solns. joined with the kinetic theory of aggregation and its predictive capability is discussed. Utilization of statistical mechanics of polydisperse polymer solns. joined with kinetic theory of aggregation enables one to develop a realistic model which is able to predict both reversible and irreversible heavy org. depositions. The present model is capable of describing several reversible and irreversible situations, such as the phenomena of org. deposition, growing mechanism of heavy org. aggregates, the size distributions of pptd. orgs. and the soly. of heavy orgs. in a crude oil due to variations in oil pressure, temp. and compn. As an example, the present model is applied for heavy orgs. deposition prediction of two different Brazilian crude oils for which exptl. data are available. The prediction results of the present model are in good agreement with the exptl. data.

REFERENCE COUNT: 38

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L3 ANSWER 9 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:118942 CAPLUS

DOCUMENT NUMBER: 137:8358

TITLE: "Interfacial and colloidal behavior of asphaltenes obtained from Brazilian crude oils"

AUTHOR(S): *Carlos da Silva Ramos, Antonio; Haraguchi, Lilian; Notrispe, Fabio R.; Loh, Watson; Mohamed, Rahoma S.*

CORPORATE SOURCE: Universidade Estadual de Campinas, School of Chemical Engineering, Campinas-SP, Brazil

SOURCE: **Journal of Petroleum Science & Engineering (2001), 32(2-4), 201-216**

CODEN: JPSEE6; ISSN: 0920-4105

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB In this work, we present new data on the interfacial and colloidal behavior of asphaltenes in model arom. solvents and crude oils and discuss the implications of these data on the aggregation, adsorption on solid surfaces, inhibition of deposition and emulsion stabilization capacities for two types of asphaltenes obtained from Brazilian crude oils. Surface tension measurements in solns. formed by any of these two types of asphaltenes, pentane insolubles (C5I) or heptane insolubles (C7I), in arom. solvents suggested the occurrence of an aggregation phenomenon of asphaltenes in each of the solvents studied. Viscosity measurements in these same solns. revealed yet another type of aggregation at higher asphaltene concns. Both aggregation processes were found to be a function of temp. and type of asphaltenes. For the asphaltenes investigated, C7I was always more prone to aggregation, a characteristic ascribed to its higher asphaltene and lower resin content as revealed by SARA chromatog. anal., and to its larger av. mol. wt. as detd. by VPO. The effect of temp. on these two processes confirmed the exothermic nature of both. A no. of block copolymers, ionic and non-ionic surfactants, were tested for their effectiveness as asphaltenes stabilizers in crude oil. The results revealed different and distinct mechanisms for solubilization /dispersion of asphaltenes in arom. (aliph.) solvents and for the inhibition of asphaltene pptn. in crude oils. The two types of asphaltenes (C5I and C7I) were found to be effective in the stabilization of water/oil emulsions as well as water/toluene emulsions, with larger effects for C7I in water/toluene emulsions, consistent with its greater surface activity and its larger tendency to self-assoc. Finally, the interaction of asphaltenes with solid surfaces was evaluated by detg. the adsorption isotherms of asphaltenes on silica and activated carbon. The org. adsorbent was found to be much more efficient in removing asphaltenes due, perhaps, to the similar chem. nature of the adsorbing species and adsorbent. In all cases, evidence points to multilayer formation, in agreement with the previously detected tendency of asphaltenes to aggregate. REFERENCE COUNT: 53

L3 ANSWER 10 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:96277 CAPLUS

DOCUMENT NUMBER: 136:297135

TITLE: "Sensitivity of Asphaltene Properties to Separation Techniques"

AUTHOR(S) *Alboudwarej, H.; Beck, J.; Svrcek, W. Y.; Yarranton, H. W.; Akbarzadeh, K.*

CORPORATE SOURCE: Department of Chemical and Petroleum Engineering, The University of Calgary, Calgary, Can.

SOURCE: **Energy & Fuels (2002), 16(2), 462-469**

CODEN: ENFUEM; ISSN: 0887-0624

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Asphaltene properties vary with sepn. method and sometimes with individual technique. Factors such as contact time, solvent-to-crude oil ratio, and temp. influence asphaltene pptn. and are somewhat standardized. However, the final step in most seps., washing the asphaltene filter cake with solvent, is not standardized. Asphaltene properties can be very sensitive to small amts. of resins and therefore may be sensitive to the amt. of washing. Asphaltenes were extd. with three different levels of washing from four source oils (Athabasca, Cold Lake, Lloydminster, and Peace River). In all cases, increased washing decreased asphaltene yield and slightly increased asphaltene d. Increased washing significantly increased molar mass and decreased the soly. of the extd. asphaltenes. A new washing method using a Soxhlet app. removed the largest amt. of resinous material and yielded asphaltenes with significantly different properties from conventionally washed asphaltenes. Since more resinous material was removed, the Soxhlet method allows a more direct comparison between asphaltenes from different sources. Asphaltenes were also extd. using three std. sepn. methods, IP 143, ASTM D4124, and a method proposed by Speight. Some property variations between the methods were obsd. and a set of criteria to obtain consistent samples is proposed.

REFERENCE COUNT: 12

L3 ANSWER 11 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:705677 CAPLUS

DOCUMENT NUMBER: 136:8736

TITLE: "Effect of experimental conditions and solvents on the precipitation and composition of asphaltenes"

AUTHOR(S): *Pillon, Lilianna Z.*

CORPORATE SOURCE: Petroleum Products Consulting, Sarnia, ON, N7S 5W8, Can.

SOURCE: **Petroleum Science and Technology (2001), 19(5 & 6), 673-683**

CODEN: PSTEFV; ISSN: 1091-6466

PUBLISHER: Marcel Dekker, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The ASTM D 3279 test method for "n-Heptane Insolubles" is being currently used to det. the asphaltene content of fuel oils as defined by insoly. in normal (n) heptane solvent. Pptn. of n-heptane insolubles can produce sediments which vary in color, morphol. and compn. The SEM anal. of n-heptane insolubles indicated that the sediments were heterogeneous contg. some large particles > 300 .mu. and the majority of particles to be small, < 10 .mu., "chained" together forming agglomerates. Significant fractions of n-heptane insolubles were found insol. in toluene indicating their non-asphaltenic nature ("solids"). FTIR and XRF analyses of "solids" indicated the presence of multiring aroms., Ni and carboxylate and sulfate salts. FTIR anal. of toluene sol.

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asphaltenes showed the presence of multiring aroms. GC/MS anal. of toluene sol. asphaltenes indicated desorption of alkylbenzenes and O-contg. mols. but no desorption of N- and S-contg. mols. was obsd. The tendency for N- and S-contg. mols. to remain in the nonvolatile residue during the GC/MS anal. indicates that the N- and S-contg. compds. have higher stability. The XRF anal. of the toluene sol. asphaltenes indicated that the mols. are similar to asphaltenes found in crude oils in terms of C, H, N and S contents, however, no presence of V- and Ni-contg. mols. was found.

REFERENCE COUNT: 5

L3 ANSWER 12 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:641076 CAPLUS

TITLE: Pyrolysis kinetics of Turkish asphaltenes

AUTHOR(S): Yasar, Muzaffer; Erturk, Suheyla; Gulensoy, Huseyin; Gurkaynak, M. Ali

CORPORATE SOURCE: Department of Chemical Engineering, University of Istanbul, Istanbul, 34850, Turk.

SOURCE: Abstracts of Papers, 222nd ACS National Meeting, Chicago, IL, United States, August 26-30, 2001 (2001), PETR-064. American Chemical Society: Washington, D. C.

CODEN: 69BUZP

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB Asphaltenes pptd. from Turkish heavy crude oil were subjected to pyrolysis reactions at 375, 400 and 425 oC for reaction times ranging from 20 to 120 min in batch tubing reactors. Reaction products were recovered as gas, maltene, asphaltene, and coke lumps, based on a solvent extn. protocol where heptane-sol. material was defined as maltene, toluene-sol. material as asphaltene, and toluene-insol. material as coke. The yield of each product fraction was detd. gravimetrically. The variations of products yields were used to calc. the reaction rate consts. and the activation energies for asphaltenes pyrolysis. The distribution of hydrogen according to structural type in the Yenikoy Crude oil and their fraction was investigated by proton NMR. The elemental content of Yenikoy also was detd. Exptl. results provided insights into Yenikoy asphaltene structure, pyrolysis reaction kinetics, coke, maltene, and gas formation. Keywords : Asphaltene, kinetics, pyrolysis.

L3 ANSWER 13 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:375191 CAPLUS

DOCUMENT NUMBER: 134:342204

TITLE: "Precipitation onset and physical models of asphaltene solution behavior"

AUTHOR(S): *Donaggio, F.; Correra, S.; Lockhart, T. P.*

CORPORATE SOURCE: Eni Tecnologie S.p.A., Milanese, Italy

SOURCE: **Petroleum Science and Technology (2001), 19(1 & 2), 129-142**

CODEN: PSTEFV; ISSN: 1091-6466

PUBLISHER: Marcel Dekker, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The onset of asphaltene pptn. provides important information about the thermodyn. state of the asphaltene solute in a given hydrocarbon system (a stock tank oil, a residue, or an asphaltenic soln.). Such measurements are carried out by titrating the system with an asphaltene anti-solvent (an n-paraffin) while measuring some phys. property (e.g., light absorbance, elec. cond., viscosity) that displays a distinctive discontinuity at the onset of phase sepn. The quantity of anti-solvent required to attain this condition is expressed in most cases as mass (or vol.) of anti-solvent per unit mass of oil. In the present work, the empirical models that were proposed to account for asphaltene behavior in the titrn. expts. are described and compared critically. It is shown that they can all be reduced to a single general form that identifies a peculiar behavior of these systems: the onset conditions for pptn. are independent of the asphaltene concn. This behavior cannot be represented by most of the theor. models proposed in literature. It is argued that the discordance between the obsd. behavior and the attempted math. descriptions derives, in large part, from an uncrit. use of phys. models of the asphaltenes. A tentative, new phys. interpretation of asphaltene phase behavior is offered together with a simple math. model for predicting the onset conditions based on the results of titrn. expts.

REFERENCE COUNT: 28

L3 ANSWER 14 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:375188 CAPLUS

DOCUMENT NUMBER: 134:369160

TITLE: "New techniques and methods for the study of aggregation, adsorption, and solubility of asphaltenes. Impact of these properties on colloidal structure and flocculation"

AUTHOR(S): *Castillo, Jimmy; Fernandez, Alberto; Ranaudo, Maria A.; Acevedo, Socrates*

CORPORATE SOURCE: Laboratories of Fisicoquimica and Universidad Central de Venezuela, Facultad de Ciencias, Escuela de Quimica, Caracas, 1041, Venez.

SOURCE: **Petroleum Science and Technology (2001), 19(1 & 2), 75-106**

CODEN: PSTEFV; ISSN: 1091-6466

PUBLISHER: Marcel Dekker, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The soly. of Furril asphaltene in toluene was 57g L-1. However, using a new technique, based on the pptn. of this sample by the phenol PNP, we found that a fraction (2), comprising 47% of the asphaltene, is of low soly. This suggested that this material constitutes the colloidal phase, and the rest acts as the dispersing fraction. This technique allowed the fractionation of asphaltenes in fractions A1, A2, and A3 according to soly., going from practically insol. (A1) to low (A2, 1 g L-1) to high (A3, around 57 g L-1). The adsorption isotherms of asphaltenes on glass and silica in toluene consist of a sequence of steps or step-wise adsorption. The first layer or first step is formed by the adsorption of free asphaltene mols. and by small aggregates (aggregation no. between 3 and 6) which sat. the glass or silica surface in the usual manner (L-type or H-type isotherms). However, we suggest that the second, third, and other asphaltene layers adsorb sequentially according to the above differences in soly. The very slow changes with time and the negligible desorption from the surface measured for the above

isotherms were interpreted as the effect of packing or the building up of a well packed layer. This would be achieved by the slow formation and rupture of bonds between neighboring mols. at the surface. Thus, mols. with difficulties to pack, adsorbed by a kinetically controlled process, are either rejected or relocated in a thermodyn. controlled process. The above results and ideas were used to improve the models for asphaltene and petroleum colloids and to underscore the importance of surfaces and colloid dispersants in asphaltene pptn. during the prodn. of crude oils. For instance, the results described below suggest that colloids are constituted by a well packed and insol. asphaltene core, impervious to the solvent, and by a loose packed periphery which, by allowing solvent penetration, keep the colloid in soln. According to this model, desorption of compds. in the above loosely packed periphery, such as the one promoted by a surface, would be the main cause of asphaltene pptn. from crude oils. In this case, soly. redns. caused by pressure drops during oil prodn. would have a minor effect. Also, preliminary no. av. mol. wts. Mn for four asphaltenes, obtained using a new procedure, are presented here. The Mn values obtained ranged from 780 to 1150 g/mol.

REFERENCE COUNT: 25

L3 ANSWER 15 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:423430 CAPLUS

DOCUMENT NUMBER: 133:45863

TITLE: "Particle size, solvent, oxygen, temperature and pressure effects on the contents of insoluble fractions from solid vacuum residua"

AUTHOR(S): *Carbognani, Lante; Espidel, Joussef; Carbognani, Natasha; Albuja, Leryn; Rosquete, Marisol; Parra, Liakarla; Mota, Jennifer; Espidel, Anita; Querales, Nancy*

CORPORATE SOURCE: Analysis & Evaluation Department, PDVSA-INTEVEP, Research and Technological Center of Petroleos de Venezuela, Caracas, 1070A, Venez.

SOURCE: **Petroleum Science and Technology (2000), 18(5 & 6), 671-699**

CODEN: PSTEFV; ISSN: 1091-6466

PUBLISHER: Marcel Dekker, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB N-Heptane insol. contents were detd. for an extra-heavy petroleum vacuum residue, one petroleum and one coal pitch as a function of particle size. This variable was found to affect the yields of insol. material, aspect which was also obsd. during extns. carried out with arom. and halogenated solvents. The precision of results was obsd. to be independent on the operators. A study was carried out to det. the effect of sample drying time on fraction yields. Malthene fractions were strongly dependent on this variable, whereas asphaltene fractions were totally independent. Pre-dissoln. in arom. solvents proved worthless from the repeatability point of view. However, pre-dissoln. of the oil residue in CH₂Cl₂ followed by filtration and asphaltene pptn. with simultaneous solvent removal, was deemed to be a suitable technique to remove mineral matter and isolate asphaltenes in a single step. Sample oxidn. during asphaltene pptn. and isolation was detected by gravimetric and spectroscopic techniques. This fact is very important since common pptn. techniques do not address this issue. Preliminary accelerated extn. expts.

carried out with pitch samples at high temp. and pressure, revealed that this approach can be a very interesting research tool to investigate soly. properties.
REFERENCE COUNT: 41

L3 ANSWER 16 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1999:221114 CAPLUS

DOCUMENT NUMBER: 130:327007

TITLE: "Analysis of insolubles of petroleum vacuum residues using TLC-FID"

AUTHOR(S): *Sharma, B. K.; Sarowha, S. L. S.; Bhagat, S. D.; Tiwari, R. K.; Gupta, S. K.; Venkataramani, P. S.*

CORPORATE SOURCE: Indian Institute of Petroleum, Dehra dun, 248 005, India

SOURCE: **Petroleum Science and Technology (1999), 17(3 & 4), 319-332**

CODEN: PSTEFV; ISSN: 1091-6466

PUBLISHER: Marcel Dekker, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The insolubles (generally termed as asphaltenes) were obtained from pptn. of Jodhpur and Heera vacuum residue using n-hexane, n-heptane and Et acetate followed by repptn. of n-heptane and Et acetate sol. fractions of above using n-pentane. In order to investigate the solvent extn. power of different solvents and the compn. of different insolubles, a TLC-FID procedure was optimized using silica S III Chromrods with dichloromethane (95%)-methanol (5%) mixt. as developing solvent. In this method, the problems usually encountered in column chromatog. and solvent extn. methods are overcome. The method is rapid and needs a small amt. of samples. Three peaks were obtained, thus providing compn. of different insolubles in terms of three different compd. classes, i.e. resins, asphaltenes and preasphaltenes. JVR insolubles were found to consist more amt. of asphaltenes and preasphaltenes in comparison to HVR insolubles. The content of asphaltenes and preasphaltenes in heptane insolubles are relatively higher than that in n-hexane and Et acetate insolubles. It is concluded that these insolubles are indeed dominated by resins that cannot be extd. fully in different solvents such as n-hexane, n-heptane, Et acetate and n-pentane.

REFERENCE COUNT: 13

L3 ANSWER 17 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1998:278514 CAPLUS

DOCUMENT NUMBER: 128:272520

TITLE: "The solubility and three-dimensional structure of asphaltenes"

AUTHOR(S): *Schabron, John; Speight, James G.*

CORPORATE SOURCE: Western Research Institute, Laramie, WY, 82072-3380, USA

SOURCE: **Petroleum Science and Technology (1998), 16(3 & 4), 361-375**

CODEN: PSTEFV; ISSN: 1091-6466

PUBLISHER: Marcel Dekker, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The tendency of the asphaltenes to form aggregates in hydrocarbon soln. is one of their most characteristic features and has tended to complicate the detn. of the structure of

petroleum. In addn., if the compn. and properties of the pptd. asphaltenes reflect those of the micelles in soln., the latter should be considered mixed micelles. This is reasonable assumption in view of the large quantities of sol. resins found in the pptd. solid. Empirical observation indicate that the resins play an important role in stabilizing asphaltenes in crude oil and under unfavorable solvent conditions the asphaltene species are prone to further aggregation into clusters that are unstable and ppt. from the crude oil. It is also suggested that the resins and the asphaltenes from a particular crude oil have points of structural similarity relative to the asphaltenes and resins from another crude oil. On a more localized scale, i.e. in one particular crude oil there are also structural differences within the constituents of asphaltenes and structural differences within the constituents of the resins are also anticipated. Therefore, the structure of the micelles within any one crude oil must be expected to be varied and non-homogeneous. From the evidence cited herein, it follows that the potential for graphite-type stacking by the asphaltene mols. in the center of a micelle might not be as great as the potential for the micelles forming by asphaltene-resin interactions rather than by asphaltene-asphaltene interactions. REFERENCE COUNT: 62

L3 ANSWER 18 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1998:66357 CAPLUS

DOCUMENT NUMBER: 128:90793

TITLE: "Boundaries of colloid stability of crude oils"

AUTHOR(S): *Laux, Horst; Rahimain, I.*

CORPORATE SOURCE: Inst. Erdoel- Erdgasforschung, Clausthal-Zellerfeld, Germany

SOURCE: **Erdoel, Erdgas, Kohle (1998), 114(1), 25-29**

CODEN: EEKOEY; ISSN: 0179-3187

PUBLISHER: Urban-Verlag

DOCUMENT TYPE: Journal

LANGUAGE: German

AB The strong intermol. interactions between different org. compds. are the reason of the formation of a colloid-disperse phase in crude oils and can be estd. by the soly. parameters. Using the Hansen three-component soly. parameters the stability of an asphaltene dispersion in org. solvents can be described by a spherical soly. region with a radius of about 5 Δ -units [MJm⁻³]^{0.5}. The center of the sphere is given by the soly. parameters of asphaltenes. Detg. the flocculation points of crude oils in different solvents it is found, that the soly. parameters of the solvent-precipitant-mixt. at the flocculation points correlate with the boundaries of the spherical soly. region. From the differences between the boundaries of soly. region and the flocculation point results the influence of solvation on the stability of colloid-disperse phase is discussed. Polar and non-polar precipitants have different influence on the mechanism of pptn.

L3 ANSWER 19 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1998:52558 CAPLUS

DOCUMENT NUMBER: 128:182282

TITLE: "Effects of asphaltene aggregation in model heptane-toluene mixtures on stability of water-in-oil emulsions"

AUTHOR(S): *McLean, Joseph D.; Kilpatrick, Peter K.*

CORPORATE SOURCE: Dep. Chem. Eng., North Caroline State Univ., Raleigh, NC, 27695-7905, USA

SOURCE: **Journal of Colloid and Interface Science (1997), 196(1), 23-34**

CODEN: JCISA5; ISSN: 0021-9797

PUBLISHER: Academic Press

DOCUMENT TYPE: Journal

LANGUAGE: English

AB To study the stability of water-in-crude petroleum emulsions, model petroleum were used to examine the effects resin-asphaltene interactions on emulsion stability and crude petroleum soly. These model petroleum were constructed by dissolving varying amts. of resins and/or asphaltenes in 7:3 heptane-toluene mixt. The resins and asphaltenes were isolated from four different crude types: Arab Berri, Arab Heavy, Alaska North Slope, and San Joaquin Valley. Asphaltenes dissolved in the heptane-toluene mixt. (at 0.5% concn.) generated emulsions which were even more stable than those generated from their resp. whole crude petroleum. Some types of resins also demonstrated an ability to stabilize emulsions although these resin-stabilized emulsions were considerably less stable than those prep'd. with asphaltenes. The primary factors governing the stability of these model emulsions were the aromaticity of the crude medium (as controlled by the heptane:toluene ratio), the concn. of asphaltenes, and the availability of solvating resins in the petroleum (i.e., the resin/asphaltene or R/A ratio). The model emulsions were the most stable when the crude medium was 30-40% toluene and in many cases at small R/A ratios (i.e., R/A \leq 1). This strongly supports the theory that asphaltenes are the most effective in stabilizing emulsions when they are near the point of incipient pptn. These types of resins and asphaltenes also played a role in detg. the resulting emulsion stability which indicated the importance of specific resin-asphaltene interactions. The interfacially active components that stabilized these model systems were the most polar and/or condensed portions of the resin and asphaltene fractions. All of these results pointed to the significance of the soly. state of the asphaltenes in detg. the emulsifying potential of these crude petroleum.

REFERENCE COUNT: 17

L3 ANSWER 20 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:757156 CAPLUS

DOCUMENT NUMBER: 126:34077

TITLE: "Molar mass distribution and solubility modeling of asphaltenes"

AUTHOR(S): *Yarranton, Harvey W.; Masliyah, Jacob H.*

CORPORATE SOURCE: Dept. of Chemical Engineering, Univ. of Alberta, Alberta, T6G 2G6, Can.

SOURCE: **AIChE Journal (1996), 42(12), 3533-3543**

CODEN: AICEAC; ISSN: 0001-1541

PUBLISHER: American Institute of Chemical Engineers

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Attempts to model asphaltene soly. with the Scatchard-Hildebrand theory were hampered by uncertainty in molar vol. and soly. parameter distribution within the asphaltenes. By considering asphaltenes as a series of polyarom. hydrocarbons with

randomly distributed assocd. functional groups, molar volume and soly. parameter distributions were calcd. from exptl. measurements of molar mass and d. The molar mass distribution of Athabasca asphaltenes was detd. from interfacial tension and vapor pressure osmometry measurements together with plasma-desorption mass spectrometry . detns. from the literature. Asphaltene densities were calcd. indirectly from mixts. of known concn. of asphaltenes in toluene. Asphaltene d., molar volume, and soly. parameter were correlated with molar mass. Solid-liq. equil. calcns. based on soly. theory and the asphaltene property correlations successfully predicted exptl. data for both the pptn. point and the amt. of pptd. asphaltenes in toluene-hexane solvent mixts.

L3 ANSWER 21 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:160131 CAPLUS

DOCUMENT NUMBER: 124:236688

TITLE: "A unified view of the colloidal nature of asphaltenes"

AUTHOR(S): *Acevedo, Socrates; Ranaudo, Maria A.; Escobar, Gaston; Gutierrez, Luis B.; Gutierrez, Xiomara*

CORPORATE SOURCE: Escuela de Quimica, Facultad de Ciencias, Universidad Central de Venezuela, Caracas, 1070A, Venez.

SOURCE: **Asphaltenes (1995), 131-54.** Editor(s): Sheu, Eric Y.; Mullins, Oliver C. Plenum: New York, N. Y.

CODEN: 62MCAK

DOCUMENT TYPE: Conference

LANGUAGE: English

AB Asphaltenes, the high mol. wt. component of crude oil is in reality a very complex mixt. of compds. which exist in petroleum as a colloidal dispersion. Evidence presented here, together with information in the literature, suggest that these colloidal particles are a mixt. of satd., arom., resin, and asphaltene compds. Presumably satd. and arom. compds. are adsorbed (or absorbed) on the periphery of the particles due to the interfacial tension effect. As the center of the particle is approached, resins, polar compds. and asphaltenes are encountered. Anal. of the results suggests strongly that the core of the particle is insol. (soly. $<0.5 \text{ gL}^{-1}$) in all solvents which dissolve the asphaltenes. The interfacial tension between the crude oil and the particle is considered here of paramount importance in detg. the soly. of asphaltenes. The crude oil could be considered as a supersatd. soln. with regard to asphaltenes, which, together with the multifunctional chem. nature of the particle explains the tendency of asphaltenes to ppt., and to be adsorbed by interfaces of quite different nature. In this chapter, the soly. and the adsorption on inorg. solid substrates and at the water-oil interface of asphaltenes are discussed and its consequences, regarding CMC, flocculation of asphaltenes, micelle formation and dispersion, and interfacial (oil-water) tension changes with time are discussed.

L3 ANSWER 22 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:134629 CAPLUS

DOCUMENT NUMBER: 124:183854

TITLE: Small angle neutron scattering studies of asphaltic materials

AUTHOR(S): Storm, D. A.; Sheu, E. Y.

CORPORATE SOURCE: Texaco R&D, Beacon, NY, 12508, USA

SOURCE: Materials Research Society Symposium Proceedings (1995), 376(Neutron Scattering in Materials Science II), 449-58

CODEN: MRSPDH; ISSN: 0272-9172

PUBLISHER: Materials Research Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Asphaltic materials are used as binders for road asphalts. Such materials have been found to contain a dispersed phase of colloidal particles in the size range of 50-100

.ANG., according to small angle X-ray scattering (SAXS) techniques. The presence of this dispersed phase has a significant influence on the rheol. properties of these materials. These colloidal particles can be isolated by pptn. with heptane, and so they are assocd. with the well-known asphaltene soly. class in some manner. Previously published results suggest that at least part of the asphaltenes are surface active agents in certain solvents such as toluene, or pyridine, and can form micelles in these solvents. Small angle neutron scattering (SANS) indicates the micelles are spherical with av. radii in the 50-100 .ANG. range. There is a polydispersity of sizes. The micelles do not grow in these solvents with increasing concn. in the range of 1-10 wt.%, nor do they dissoc. on heating to apprx. 170.degree.. At higher concns., however, a more complicated structure develops. The micelles aggregate to form a large cluster composed of micelles. The fractal dimension of the clusters is found to be 1.8.

L3 ANSWER 23 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:95982 CAPLUS

DOCUMENT NUMBER: 124:150345

TITLE: "Two-dimensional solubility parameter mapping of heavy oils"

AUTHOR(S): *Wiehe, Irwin A.*

CORPORATE SOURCE: Corp. Res. Lab., Exxon Res. Eng. Co., Annandale, NJ,
08801-0998, USA

SOURCE: **Fuel Science & Technology International** (1996), 14(1 & 2), 289-312

CODEN: FSCTEG; ISSN: 0884-3759

PUBLISHER: Dekker

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The soly. and insoly. of heavy oils and their fractions in dil. mixts. with various solvents were used to characterize heavy oil interactions. A two-dimensional soly. parameter, developed for the selection of solvents for org. polymers, was found to group all the solvents for each heavy oil fraction in polygon areas when the complexing soly. parameter component was plotted against the field force soly. parameter component. All fractions of Cold Lake vacuum residua, except for the sat. fraction, form concentric soly. areas. Therefore, in going in the direction of decreasing aromaticity from coke to asphaltenes to resins to aroms., all solvents for the previous fraction in the series are also solvents for all subsequent fractions in the series. As a result, asphaltenes can be pptd., but not extd., from heavy oils. This is attributed to the interaction among polynuclear aroms. being the dominate interaction in petroleum that causes insoly. in hydrocarbon liqs. However, the paraffinic chains on the same petroleum mols. limit their soly. in highly complexing liqs. In contrast, even vacuum gas oils from the Exxon Donor Solvent

coal liquefaction process are insol. in arom. liqs. but sol. in moderately complexing liqs. because of hydrogen bonding, resulting from oxygen functionality. Hydrotreating of these coal derived vacuum gas oils reduces their oxygen functionality and increases their soly. areas so that they become compatible with petroleum liqs.

L3 ANSWER 24 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:95981 CAPLUS

DOCUMENT NUMBER: 124:150306

TITLE: "Asphaltene precipitation and dissolution investigation of temperature and solvent effects"

AUTHOR(S): *Andersen, Simon Ivar; Stenby, Erling H.*

CORPORATE SOURCE: Dep. Chem. Eng.-IVC-SEP, Technical Univ. Denmark, Lyngby, DK2800, Den.

SOURCE: **Fuel Science & Technology International (1996), 14(1 & 2), 261-87**

CODEN: FSCTEG; ISSN: 0884-3759

PUBLISHER: Dekker

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Petroleum asphaltenes have been pptd. in n-heptane-toluene mixts. at various temps.; similarly, n-heptane-pptd. asphaltenes were dissolved in under similar conditions. This gave added evidence to an apparent hysteresis phenomenon obsd. between the two processes. The asphaltenes were characterized showing that although data were scattered, convergence to certain structural parameters as incipient flocculation was approached. The asphaltenes were seen to consist of an assocg. and a non-assocg. part. The soly. of asphaltenes was correlated and modeled using the Flory-Huggins equation using two different terms for the Flory parameter. A process for evaluation of the best choice of soly. parameter and molar volume for the asphaltenes was proposed. Dissoln. processes were best fitted by the equations. Based on these results, the asphaltenes were proposed to be formed by a colloidal part and a true soln. part.

L3 ANSWER 25 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1995:744027 CAPLUS

DOCUMENT NUMBER: 123:148440

TITLE: "An experimental study of the effect of paraffinic solvents on the onset and bulk precipitation of asphaltenes"

AUTHOR(S): *Hammami, Ahmed; Chang-Yen, Dinese; Nighswander, John A.; Stange, Ellen*

CORPORATE SOURCE: DB Robinson Res. Ltd., Edmonton, AB, Can.

SOURCE: **Fuel Science & Technology International (1995), 13(9), 1167-84**

CODEN: FSCTEG; ISSN: 0884-3759

PUBLISHER: Dekker

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The onset of asphaltene pptn. and bulk deposition were measured for a typical live reservoir petroleum titrated with n-C₆H₁₄, n-C₅H₁₂, n-C₄H₁₀, C₃H₈, C₂H₆, CH₄, and CO₂ at 100.degree. and 29.9 MPa. The concn. of titrant at onset of asphaltene pptn.

decreased approx. in a linear fashion with decreasing mol. wt. of the paraffinic solvent ; CH₄ did not induce any asphaltene pptn. Bulk deposition expts. were performed using a 10:1 solvent-oil vol. ratio. The amt. (wt.%) of asphaltenes pptd. increased exponentially with decreasing mol. wt. of the paraffinic solvents. More importantly, the asphaltene mol. wt. showed a max. for n-C₄H₁₀-pptd. asphaltenes. Possible explanations for this unusual result are presented.

L3 ANSWER 26 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1994:683203 CAPLUS

DOCUMENT NUMBER: 121:283203

TITLE: Dissolution of solid Boscan asphaltenes in mixed solvents

AUTHOR(S): Andersen, Simon Ivar

CORPORATE SOURCE: Dep. Chem. Eng. IVC-SEP, Technical Univ. Denmark, Lyngby, DK-2800, Den.

SOURCE: Fuel Science & Technology International (1994), 12(11&12), 1551-77

CODEN: FSCTEG; ISSN: 0884-3759

PUBLISHER: Dekker

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Solid petroleum asphaltenes have been fractionated according to soly. in toluene/n-heptane mixts. of increasing toluene content. A large hysteresis was obsd. between this dissoln. and the pptn. from the crude oil. In order to shed light on the soln. mechanism, the fractions were analyzed by size exclusion chromatog. (SEC), VPO, elemental anal., UV-vis adsorption spectroscopy and phenol interaction values and methylene content by FTIR. Less polar non-assocg., low-mol.-wt. species are dissolved and a specific extn. of porphyrins is obsd. An increased assocn. in the insolubles is indicated. More basic interaction sites are available on the asphaltenes in both fractions relative to the native asphaltene. From the SEC chromatograms it was seen that the sol. fractions did not assoc. as the insol. fractions even when making up more than 60% of the total asphaltenes.

L3 ANSWER 27 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1994:34265 CAPLUS

DOCUMENT NUMBER: 120:34265

TITLE: Thermodynamic modeling for organic solid precipitation

AUTHOR(S): Chung, T. H.

CORPORATE SOURCE: Natl. Inst. Pet. Energy Res., Bartlesville, OK, USA

SOURCE: Report (1992), NIPER-623; Order No. DE93000104, 29 pp. Avail.: NTIS

From: Energy Res. Abstr. 1993, 18(3), Abstr. No. 6153

DOCUMENT TYPE: Report

LANGUAGE: English

AB A thermodyn. model for org. solid pptn. is developed. The effects of temp., compn., and activity coeff. on the soly. of wax and asphaltenes in org. solns. are included. The solid-liq. equil. K-value is expressed as a function of the heat of melting, m.p., soly. parameter, and the molar volume of each component in the soln. All these are correlated with mol. wt. Thus, the model can be applied to crude oil systems. The model has been

tested with exptl. data for wax formation and asphaltene pptn. The predicted wax appearance temp. is very close to the measured temp. The model not only can match the measured asphaltene soly. data but also can be used to predict the soly. of asphaltene in org. solvents or crude oils. The model assumes that asphaltenes are dissolved in oil in a true liq. state, not in colloidal suspension, and the pptn.-dissoln. process is reversible by changing thermodyn. conditions. The model is thermodynamically consistent and has no ambiguous assumptions.

L3 ANSWER 28 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1993:496642 CAPLUS

DOCUMENT NUMBER: 119:96642

TITLE: Study on advanced supercritical fluid technology. Application to chemical reaction, purification and polymer processing processes

AUTHOR(S): Sako, Takeshi; Sugeta, Tsutomu; Nakazawa, Noriaki; Sato, Masahito

CORPORATE SOURCE: Natl. Chem. Lab. Ind., Tsukuba, Japan

SOURCE: Kagaku Gijutsu Kenkyusho Hokoku (1992), 87(8), 227-44

CODEN: KGKHEP; ISSN: 0388-3213

DOCUMENT TYPE: Journal

LANGUAGE: Japanese

AB Supercrit. fluid technol. was developed to apply to chem. reaction and purifn. processes, and new thermodyn. model was developed to describe the phase behavior of supercrit. fluid-polymer system. A typical successive reaction, the furfural (I) formation from xylose, and a heterogeneous catalytic reaction, the isomerization of supercrit. pentane (II), are studied. In the former case, the extn. of I with supercrit. CO₂ improved the selectivity of I by suppressing the side reactions of the highly reactive I, and the effect of I extn. on its selectivity could be described by a simple reaction/extn. model. In the latter case, the supercrit. II, acting as as both reactant and extn. solvent of coke, maintained high catalytic activity for a long time by removing the coke deposited on a solid catalyst, and a new reaction model could predict changes in the catalytic activity with time on stream under a given temp. and pressure. For the purifn. process, sepn. of each component in a mixt. of naphthalene (III) and phenanthrene (IV) was examd. using retrograde crystn. from supercrit. CO₂. By increasing the temp. from 308 to 328 K 97.1% III was deposited at 14 MPa, while by decreasing the temp. from 328 to 308 K 96.5% IV was pptd. at the same pressure. For the thermodyn. modeling of supercrit. fluid-polymer phase behavior, a new equation of state, which was applicable to fluids contg. small or large mols. including polymers, was developed on the basis of generalized Van der Waals theory; the relatively simple equation could describe the high-pressure phase equil. for supercrit. ethylene (V)/poly-V system and was useful for engineering-design calcs. of polymer process.

L3 ANSWER 29 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1992:554087 CAPLUS

DOCUMENT NUMBER: 117:154087

TITLE: "Asphaltene precipitation and incipient flocculation in mixed solvents"

AUTHOR(S): Andersen, Simon I.; Speight, James G.

CORPORATE SOURCE: Dan. Nat. Sci. Res. Counc., Copenhagen, DK-1553, Den.

SOURCE: Preprints of Papers - American Chemical Society, Division of Fuel Chemistry (1992), 37(3), 1335-41

CODEN: ACFPAI; ISSN: 0569-3772

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Discrepancies between methods (equil. pptn. and flocculation titrn.) employed to det. the incipient pptn. of asphaltenes may be related to slow kinetics of pptn. Soly. parameters of asphaltenes can be measured by the titrn. method but relative to the exptl. parameters such as time, solvent and solute (asphaltene or oil) concn. The recovery of a PhMe insol. fraction from a PhMe-sol. fraction shows the complexity of the asphaltene aggregation during pptn. Evidence of rearrangements of mol. interactions is suggested.

L3 ANSWER 30 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1992:496250 CAPLUS

DOCUMENT NUMBER: 117:96250

TITLE: Analysis of SHRP asphalt nonpolar fractions by supercritical fluid chromatography

AUTHOR(S): Barbour, F. A.; Branthaver, J. F.

CORPORATE SOURCE: West. Res. Inst., Laramie, WY, 82071-3395, USA

SOURCE: Fuel Science & Technology International (1992), 10(4-6), 979-1001

CODEN: FSCTEG; ISSN: 0884-3759

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Three different fractions derived from each of 8 SHRP (Strategic Highway Research Program) asphalts were analyzed by supercrit. fluid chromatog. The 3 fractions were a low mol. wt. neutral fraction obtained by ion exchange chromatog., a low mol. wt. fraction obtained by size exclusion chromatog., and maltenes obtained by pptn. with hydrocarbon solvents. For a given asphalt, these fractions contain much of the same material and all comprise >1/2 of the bulk of the asphalts. The ion exchange chromatog. neutral fractions contain minimal amts. of polar materials. Based on the microstructural model of asphalt structure, any of the 3 fractions might be considered to represent the solvent phase of an asphalt. The supercrit. fluid chromatograms of the asphalt fractions showed that they comprise materials of widely ranging carbon nos., from 30 to >110. Chromatograms of all 3 fractions of each asphalt are similar, particularly the low mol. wt. size exclusion chromatog. fractions and the maltenes. Chromatograms of fractions derived from different asphalts can differ greatly. The chromatograms of fractions of sol-type asphalts exhibit peaks corresponding to constituents that are more arom. and of higher carbon no. compared with chromatograms of fractions of gel-type asphalts. Thus supercrit. fluid chromatog. is a useful tool for the investigation of relatively nonpolar fractions derived from asphalts.

L3 ANSWER 31 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1992:238498 CAPLUS

DOCUMENT NUMBER: 116:238498

TITLE: Measurement and correlation of asphaltene precipitation from heavy oils by gas injection

AUTHOR(S): Kokal, Sunil L.; Najman, Joseph; Sayegh, Selim G.; George, Albert E.
CORPORATE SOURCE: Pet. Recov. Inst., Calgary, AB, Can.
SOURCE: Journal of Canadian Petroleum Technology (1992), 31(4), 24-30
CODEN: JCPMAM; ISSN: 0021-9487

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A method for in-situ visualization of asphaltene pptn. from heavy oils with light hydrocarbon gases and CO₂ consisted of a series of titrn. expts. to det. the soly. properties of asphaltenes and included a high-pressure high-temp. micromodel flow app. to visually study the onset of asphaltene pptn. under reservoir conditions. Exptl. results are reported for pptn. of asphaltenes from Suffield and Lindbergh heavy oils (Alberta, Canada) using C₁₀ alkanes and CO₂ at 100.degree. and 20 MPa. Both the amt. and nature of the ppt. varied with the type of solvent; C₃H₈ was the solvent that pptd. the most asphaltenes. A thermodyn. model proposed by A. Hirschberg et al. (1984) was used to correlate the exptl. data.

L3 ANSWER 32 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1991:683259 CAPLUS

DOCUMENT NUMBER: 115:283259

TITLE: Properties of asphaltenes from a waxy crude

AUTHOR(S): Fuhr, B. J.; Cathrea, C.; Coates, L.; Kalra, H.; Majeed, A. I.

CORPORATE SOURCE: Oil Sands Hydrocarbon Recov. Dep., Alberta Res. Counc., Edmonton, AB, T6H 5X2, Can.

SOURCE: Fuel (1991), 70(11), 1293-7

CODEN: FUELAC; ISSN: 0016-2361

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Asphaltenes from a waxy crude were isolated using several different n-paraffins at various temps. As the C no. of the n-alkane increased from C₅ to C₈, the amt. of solvent required to initiate pptn. (onset) increased, consistent with an increase in solvating power. The amt. of asphaltene material recovered decreased with increase in C no. The av. mol. wt. of the asphaltenes generally increased with increase in C no. and with temp. The higher mol. wt. asphaltenes ppt. first upon addn. of solvent. The lower mol. wt. asphaltenes ppt. during the later stages of solvent addn. and det. the overall asphaltene content. The soly. of these asphaltenes increases with temp. Finally, higher NMR aromaticities were generally obsd. for the higher mol. wt. asphaltenes.

L3 ANSWER 33 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1991:562501 CAPLUS

DOCUMENT NUMBER: 115:162501

TITLE: Modeling of asphaltene and wax precipitation

AUTHOR(S): Chung, F.; Sarathi, P.; Jones, R.

CORPORATE SOURCE: Natl. Inst. Pet. Energy Res., Bartlesville, OK, USA

SOURCE: Report (1991), NIPER-498; Order No. DE91002217, 45 pp. Avail.: NTIS

From: Energy Res. Abstr. 1991, 16(4), Abstr. No. 9542

DOCUMENT TYPE: Report

LANGUAGE: English

AB This research project was designed to focus on the development of a predictive technique for org. deposition during gas injection for petroleum enhanced recovery. A thermodyn. model was developed to describe the effects of temp., pressure, and compn. on asphaltene pptn. The proposed model combines regular soln. theory with Flory-Huggins polymer solns. theory to predict max. vol. fractions of asphaltene dissolved in oil. The model requires evaluation of vapor-liq. equil., first using an equation of state followed by calcns. of asphaltene soly. in the liq.-phase. A state-of-the-art technique for C7+ fraction characterization was employed in developing this model. The preliminary model developed in this work was able to predict qual. the trends of the effects of temp., pressure, and compn. Since the mechanism of paraffinic wax deposition is different from that of asphaltene deposition, another thermodyn. model based on the solid-liq. soln. theory was developed to predict the wax formation. This model is simple and can predict the wax appearance temp. with reasonable accuracy. Accompanying the modeling work, exptl. studies were conducted to investigate the soly. of asphaltene in oil and solvents and to examine the effects of oil compn., CO₂, and solvent on asphaltene pptn. and its properties. This research focused on the soly. reversibility of asphaltene in oil and the pptn. caused by CO₂ injection at simulated reservoir temp. and pressure conditions. These expts. have provided many observations about the properties of asphaltenes for further improvement of the model, but more detailed information about the properties of asphaltenes in soln. is needed.

L3 ANSWER 34 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1991:105378 CAPLUS

DOCUMENT NUMBER: 114:105378

TITLE: Aggregation of asphaltenes as determined by calorimetry

AUTHOR(S): Andersen, Simon Ivar; Birdi, Kulbir S.

CORPORATE SOURCE: Dep. Phys. Chem., Tech. Univ. Denmark, Lyngby, DK-2800, Den.

SOURCE: Journal of Colloid and Interface Science (1991), 142(2), 497-502

CODEN: JCISA5; ISSN: 0021-9797

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The crit. micelle concns. (CMCs) of petroleum asphaltenes were detd. at 25.degree. in mixts. of n-alkanes and MePh by using a calorimetric titrn. method. CMC was correlated to the Hildebrand soly. parameter. CMC detns. in polar solvents showed that the correlation is valid only for the alkane-toluene system. The role of resins in formation of the micelles was investigated, showing that resins may lead to formation of a different kind of micelle that may be more stable toward pptn. The resins did not act as cosolvents in the asphaltic soln.

L3 ANSWER 35 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1990:555495 CAPLUS

DOCUMENT NUMBER: 113:155495

TITLE: Influence of temperature and solvent on the precipitation of asphaltenes

AUTHOR(S): Andersen, Simon I.; Birdi, Kulbir S.

CORPORATE SOURCE: Dep. Phys. Chem., Tech. Univ. Denmark, Lyngby, DK-2800, Den.

SOURCE: Fuel Science & Technology International (1990), 8(6), 593-615

CODEN: FSCTEG; ISSN: 0884-3759

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Asphaltenes were pptd. from a Kuwait flash residue by using different C5-8 n-alkanes at 4.degree. to reflux temps. of the used precipitants. Structures in the asphaltene fractions are studied by UV fluorescence spectroscopy, elemental anal., and to some extent H NMR. Asphaltenes pptd. in the same amt. but at different temp. and with different solvents have the same compn. For all n-alkanes the curves of pptd. amt. vs. temp. show max. at .apprx. 25.degree., implying a shift in the soly. of the asphaltenes. The impact of alkane chain length on the aggregation of asphaltenes through H bonds is discussed. The asphaltene soly. is discussed with the help of the Scatchard-Hildebrand equation.

L3 ANSWER 36 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1988:593391 CAPLUS

DOCUMENT NUMBER: 109:193391

TITLE: Asphaltenes in Saudi Arabian heavy crude oil. Solubility and molecular weights in hydrocarbon solvents

AUTHOR(S): Ali, Mohammad Farhat; Saleem, Mohammad

CORPORATE SOURCE: Dep. Chem., King Fahd Univ. Pet. Miner., Dhahran, 31261, Saudi Arabia

SOURCE: Fuel Science & Technology International (1988), 6(5), 541-56

CODEN: FSCTEG; ISSN: 0884-3759

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Asphaltenes from Saudi Arabian heavy crude oil residue (370.degree.+) were pptd. with n-alkane solvents (C5-10). The asphaltenes thus prepd. were examd. for their yields, vapor pressure osmometry (VPO) mol. wts., and ultimate compn. VPO mol. wts. were measured in 5 different solvents of varying dielec. const. (2.2-12.3). The yield and H/C ratio of the asphaltenes decreased with an increase in the C no. of the pptg. solvent. There was a general increase in the VPO mol. wts. of these asphaltenes with increasing C no. of the n-alkane solvent. The effect of dielec. const. of the solvent on the VPO mol. wt. of the asphaltenes was significant. The asphaltenes showed considerable variation in their mol. wts., depending on the nature of the solvent. The solvents of high dielec. const. generally decreased the mol. wt.

L3 ANSWER 37 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1988:207372 CAPLUS

DOCUMENT NUMBER: 108:207372

TITLE: "Isolation of asphaltenes using a continuous precipitation method"

AUTHOR(S): *Dolbear, Geoffrey E.; Phan, Huyen N.*

CORPORATE SOURCE: Unocal Sci. Technol. Div., Brea, CA, 92621, USA

SOURCE: Fuel Science & Technology International (1988), 6(4), 471-81

CODEN: FSCTEG; ISSN: 0884-3759

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Samples of 0.5 L of atm. residue are treated with 1-2 L of n-heptane, while keeping heptane/resid ratios at 40:1, by a continuous method. Asphaltenes pptd. by a batch method were identical within the errors of elemental and NMR characterization methods. Small amts. of colored, heptane-sol. materials can be extd. from samples prepd. by the continuous technique, but this extn. does not change the analyses of the extd. solids.

L3 ANSWER 38 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1988:134785 CAPLUS

DOCUMENT NUMBER: 108:134785

TITLE: Separation and coking of asphaltenes

INVENTOR(S): Herbertz, Hans Adolf; Rammler, Roland; Weiss, Hans Juergen; Solari, Rodolfo; Hidalgo, Rafael

PATENT ASSIGNEE(S): Metallgesellschaft A.-G., Fed. Rep. Ger.; Intevep, S. A.

SOURCE: Ger. Offen., 7 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO. KIND DATE APPLICATION NO. DATE

DE 3609988 A1 19871001 DE 1986-3609988 19860325

DE 3609988 C2 19940804

US 4859284 A 19890822 US 1986-906892 19860915

CA 1272459 A1 19900807 CA 1986-518965 19860924

FR 2596408 A1 19871002 FR 1986-15844 19861114

FR 2596408 B1 19930402

PRIORITY APPLN. INFO.: DE 1986-3609988 19860325

AB Sepn. of asphaltenes from heavy hydrocarbon oils and subsequent processing involves (1) mixing with a C5-12 aliph. solvent to ppt. asphaltene particles, (2) sepn. of the latter in a hydrocyclone and/or a settler, (3) evapn. of the solvent from the deasphalted oil, (4) spray drying of the asphaltene-contg. slurry to sep. the solvent vapors from asphaltene powder with high softening temp., (5) coking of a mixt of the asphaltene and hot petroleum coke, (6) cooling of gaseous and vapor coking products, (7) partial combustion of petroleum coke, and (8) partial recycling of hot petroleum coke into coking of dried powd. asphaltene. Coking in the double-shaft coking reactor permits processing of asphaltenes which start decomp. below the softening temp. Thus, 100 kg/h heavy oil contg. 12 wt.% asphaltenes was mixed with 400 kg/h hexane, asphaltenes were pptd., and the mixt was cooled to 40.degree. and decanted. The 474 kg/h liq. phase was fed into an evaporator to recover 389 kg/h hexane and 85 kg/h deasphalted oil contg. 0.59 wt.% asphaltenes. Yield of the oil was 85 wt.%. The 26 kg/h slurry from the settler contg. asphaltenes 44.2, oil 13.5, and hexane 12.3 wt.% was spray dried to recover 11

kg/h hexane and 15 kg/h dried asphaltene contg. 23 wt.% hexane-sol. components. The latter was mixed with 300 kg/h petroleum coke and preheated to 650.degree., and the resulting charge was fed into the double-shaft coking reactor and coked at atm. pressure and 620.degree.. The gaseous product was cooled to obtain 8.3 kg/h distillate and 0.9 kg/h coking gas. The total yield of the liq. products (i.e., deasphalted oil + coking distillate) was 93.3%. The resulting 305.8 kg/h petroleum coke was divided into a portion 5.1 kg/h (which was withdrawn) and a fraction 300.7 kg/h which was partially burned to heat it to 650.degree.. The preheated coke 300 kg/h was recycled and mixed with asphaltenes before coking.

L3 ANSWER 39 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1987:537195 CAPLUS

DOCUMENT NUMBER: 107:137195

TITLE: Characterization of heavy residua by application of a modified D 2007 and asphaltene separation: effect of solvents on physical and chemical properties of fractions derived from Hondo 850.degree.F residuum

AUTHOR(S): Reynolds, John G.

CORPORATE SOURCE: Lawrence Livermore Natl. Lab., Univ. California, Livermore, CA, 94550, USA

SOURCE: Fuel Science & Technology International (1987), 5(5), 593-620

CODEN: FSCTEG; ISSN: 0884-3759

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Hondo 850 .degree.F residuum was sepd. into sat., arom., resin, and asphaltene fractions by a modified D 2007 and asphaltene sepn. Two different asphaltene pptn. solvents were used, i.e., isooctane and heptane, and differences in selected phys. and chem. properties of the derived fractions were compared. The principal difference in the use of the 2 solvents was wt. recovery after the sepn. Isooctane yielded good recovery, while heptane exhibited poor recovery. Isooctane pptd. substantially more asphaltenes, as predicted from the soly. parameters of the 2 solvents. The metals concns. in the fractions were comparable for each solvent. No metals were obsd. in the sat. and arom. fractions. and approx. 300 and 1500 ppm Ni + V were obsd. in the resin and asphaltene fractions, resp. The relative distribution was also similar for both solvents, with the highest percentage coming from the asphaltenes.

L3 ANSWER 40 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1987:87533 CAPLUS

DOCUMENT NUMBER: 106:87533

TITLE: Method and apparatus for analysis and separation of solvent-refined coal samples by sequential elution

INVENTOR(S): Kingsley, Ilse S.

PATENT ASSIGNEE(S): International Coal Refining Co., USA

SOURCE: U.S., 8 pp.

CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

PATENT NO. KIND DATE APPLICATION NO. DATE

US 4634680 A 19870106 US 1983-513543 19830714

PRIORITY APPLN. INFO.: US 1983-513543 19830714

AB Continuous elution, for anal. and sepn. of distillate oils, asphaltenes, and preasphaltenes from coal liquefaction products (e.g., SRC-I process streams), comprises passing a 1st (weakest) extn. solvent upwardly through a fluidized column contg. glass beads, and injecting the sample (e.g., dissolved in a strong solvent) into the flowing extn. solvent such that a portion of the sample is dissolved and the remainder of the sample is pptd. and collected as a uniform deposit on the glass beads. Successively stronger solvents are then passed through the column to sequentially elute less sol. materials (e.g., in the sequence of oils, asphaltenes, and preasphaltenes). A solvent-refined coal (SRC-I) sample, 0.5 mL 20% soln. in THF, was injected into a glass column contg. beads which were fluidized by upward flow of 10 mL/min heptane for extn. of oils, asphaltenes with C₆H₆, and preasphaltenes with pyridine; the 3 fractions from different SRC-I samples were evaluated for reproducibility, material balance, and recovery, resulting in ± 0.1 -1.6 wt.% std. deviation, <2 wt.% difference (between calcd. and analyzed wt.%), and <1 wt.% std. deviation, resp.

L3 ANSWER 41 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1986:36578 CAPLUS

DOCUMENT NUMBER: 104:36578

TITLE: Laboratory study of solvent enhanced communication in oil sands

AUTHOR(S): Isaacs, E. E.; Green, K.

CORPORATE SOURCE: Oil Sands Res. Dep., Alberta Res. Counc., Edmonton, AB, Can.

SOURCE: Canadian Journal of Chemical Engineering (1985), 63(6), 878-85

CODEN: CJCEA7; ISSN: 0008-4034

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Miscible displacement expts. were carried out to evaluate the potential of solvents in enlarging fractures between wells to allow for larger vols. of steam to be injected during in-situ recovery operations in the Athabasca oil sands deposit. The solvents tested included CS₂ [75-15-0], PhMe [108-88-3], and a series of refinery streams and diesel fuels. Since incomplete miscibility between bitumen and some solvents caused asphaltenes to ppt., solvents were ranked in terms of bitumen compatibility. Solvents such as diesel DP-40 and diesel DC-40, which are intermediate in terms of solubilizing bitumen, were the most efficient in developing zones of low bitumen satn. around an initial fracture and at the same time not extg. bitumen from other regions of the bed. The effects of flow rate and cell orientation on solvent efficiency and permeability are also described. Solvent losses corresponded to about the residual satn. of oil after waterflooding.

L3 ANSWER 42 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1985:490255 CAPLUS

DOCUMENT NUMBER: 103:90255
TITLE: Manufacture of quinoline-insolubles-free pitch
PATENT ASSIGNEE(S): Kawasaki Steel Corp., Japan; Kawatetsu Chemical Industry Co., Ltd.
SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
PATENT NO. KIND DATE APPLICATION NO. DATE

JP 60051782 A2 19850323 JP 1983-158947 19830901

PRIORITY APPLN. INFO.: JP 1983-158947 19830901

AB Quinoline-insols. (QI)-free pitch contg. a controlled amt. of beta.-resin (quinoline-sols. (QS) and benzene-insols. (BI) fraction) is manufd. by pptn. of crude coal tar or pitch after addn. (at >150.degree. and >5 atm) of light oils or solvents contg. C₆H₆-PhMe (b. <180.degree.) or liq. products (b. <250.degree.) from coke ovens. Thus, a pitch contg. QI 2.86, QS 3.89, and pyridine-sols. (PS)-BI 13.05 wt.% was mixed with coke-oven oil (2:1 solvent-pitch wt. ratio) at 280.degree. and 40 atm for 2 min. The pptd. refined pitch contained QI <0.01, QS-pyridine-insols. 0.40, and BI-PS 12.97 wt.%.

L3 ANSWER 43 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1984:475511 CAPLUS

DOCUMENT NUMBER: 101:75511

TITLE: Influence of temperature and pressure on asphaltene flocculation

AUTHOR(S): Hirschberg, A.; DeJong, L. N. J.; Schipper, B. A.; Meijer, J. G.

CORPORATE SOURCE: Koninklijke/Shell E and P Lab., Neth.

SOURCE: SPEJ, Society of Petroleum Engineers Journal (1984), 24(3), 283-93

CODEN: SSPJDN; ISSN: 0197-7520

DOCUMENT TYPE: Journal

LANGUAGE: English

AB With respect to petroleum recovery, asphaltene soly. properties were estd. from titrn. expts. on a tank oil. In light crudes, asphaltenes assocd. with resins behave as a liq. with a soly. parameter close to that of liq. naphthalene. Purified asphaltenes have a strong tendency to aggregate and behave as a solid; the soly. is close to that of pyridine or quinoline. When resins sep. from asphaltenes (e.g., upon diln. of crude with large amts. of solvent), a different model should be used to take into account asphaltene aggregation and assocn. with resins. A simple 2- or 3-component model predicts field conditions under which the pptn. of asphaltenes occurs.

L3 ANSWER 44 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1983:128863 CAPLUS

DOCUMENT NUMBER: 98:128863

TITLE: Effect of different thinners on heavy petroleum products: measuring, interpreting and forecasting asphaltene flocculation

AUTHOR(S): Hotier, G.; Robin, M.

CORPORATE SOURCE: Inst. Pet., Rueil-Malmaison, 92506, Fr.

SOURCE: Revue de l'Institut Francais du Petrole (1983), 38(1), 101-20

CODEN: RFPTBH; ISSN: 0373-532X

DOCUMENT TYPE: Journal

LANGUAGE: French

AB An app. was developed for detecting flocculated asphaltenes in heavy petroleum product-solvent systems. This app. measures IR diffusion through solvents contg. petroleum products. The flocculation threshold and the solvent pptn. potential are defined. A list of common solubilizers and precipitants is given. The solubilizing activity of malthenes towards asphaltenes in hydrocarbon diluents is demonstrated. A graphical method for representing the flocculable material-solvent systems is presented.

L3 ANSWER 45 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1982:145504 CAPLUS

DOCUMENT NUMBER: 96:145504

TITLE: The concept of asphaltenes

AUTHOR(S): Long, Robert B.

CORPORATE SOURCE: Corporate Res. Sci. Lab., Exxon Res. and Eng. Co.,
Linden, NJ, 07036, USA

SOURCE: Advances in Chemistry Series (1981), 195(Chem. Asphaltenes), 17-27

CODEN: ADCSAJ; ISSN: 0065-2393

DOCUMENT TYPE: Journal; General Review

LANGUAGE: English

AB A review, with 10 refs., of solvent-pptn. behavior of coal and petroleum asphaltenes.

L3 ANSWER 46 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1977:586798 CAPLUS

DOCUMENT NUMBER: 87:186798

TITLE: Laboratory investigation using solvent to recover heavy oil from a fractured reservoir

AUTHOR(S): Johnson, F. S.; Jones, R. A.; Miller, J. S.

CORPORATE SOURCE: Bartlesville Energy Res. Cent., Bur. Mines, Bartlesville, OK,
USA

SOURCE: Report (1976), CONF-750493-2, 32 pp. Avail.: NTIS From: ERDA
Energy Res. Abstr. 1977, 2(10), Abstr. No. 24000

DOCUMENT TYPE: Report

LANGUAGE: English

AB Testing of 25 solvents for their effectiveness in reducing the viscosity (2820 cP) of petroleum and in preventing pptn. of its 15% asphaltene content resulted in selection of a com. solvent contg. 74.3% aroms., which lowered the oil viscosity to 73 cP at 25 vol.% concn. In simulated solvent injection using cores, the amt. of oil recovered per pore vol. produced was increased by increased soaking time, surface-vol. ratio, oil satn., and temp. Solvent flooding expts. showed the difficulty of forcing solvent through highly oil-satd. cores and the increased recovery rate caused by reversing flow. H2O-solvent injection used less solvent, but resulted in 10% less recovery than solvent flooding. Continuous

recirculation of the solvent recovered similar amts. of oil with less solvent consumption than in solvent soaking.

L3 ANSWER 47 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1977:441590 CAPLUS

DOCUMENT NUMBER: 87:41590

TITLE: Analysis of the tars from Asturian coke plants by solvent extraction

AUTHOR(S): Bermejo, J.; Gayol, O. M.

CORPORATE SOURCE: Inst. Nac. Carbon Derivados "Francisco Pintado Fe", Oviedo, Spain

SOURCE: Ion (Madrid) (1976), 36(422), 541-4

CODEN: IONMAH; ISSN: 0375-9091

DOCUMENT TYPE: Journal

LANGUAGE: Spanish

AB The tars obtained from carbonization of 6 coals in 6 Asturian coke plants were sepd. by solvent extn. and contained phenols 0.54-1.89, bases 0.99-1.64, and neutral oils 37.15-44.77% in the fraction sol. in petroleum ether and 1.08-2.68, 1.30-2.37, and 32.68-44.11%, resp., of these constituents in the fraction sol. in C₆H₆. The amts. of insol. residue and ppt. from H₂SO₄ acidification of the tars were 5.10-11.58 and 5.89-9.98%, resp.

L3 ANSWER 48 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1973:421299 CAPLUS

DOCUMENT NUMBER: 79:21299

TITLE: Solubility of asphaltenes in hydrocarbon solvents

AUTHOR(S): Mitchell, David L.; Speight, James G.

CORPORATE SOURCE: Fuel Sci. Div., Res. Counc. Alberta, Edmonton, AB, Can.

SOURCE: Fuel (1973), 52(2), 149-52

CODEN: FUELAC; ISSN: 0016-2361

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The relation between asphaltene yield and solvent properties was measured for many hydrocarbons and several blends. The implications are discussed, with some emphasis on structural entities within the asphaltene fraction. Preferential pptn. of minerals is commonly found.

L3 ANSWER 49 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1971:542494 CAPLUS

DOCUMENT NUMBER: 75:142494

TITLE: Dissolving ability and selectivity of solvents with respect to asphaltic resinous compounds of different molecular weight

AUTHOR(S): Wachal, Andrzej

CORPORATE SOURCE: Wojsk. Akad. Tech., Warsaw, Pol.

SOURCE: Nafta (Katowice, Poland) (1971), 27(7), 236-43

CODEN: NAFPAB; ISSN: 0027-7541

DOCUMENT TYPE: Journal

LANGUAGE: Polish

AB Dissolving ability and selectivity of 108 solvents belonging to different classes of org. compds. were studied with heavy crude oil residue of m.p. 10.degree. and asphaltenes pptd. by C₅H₁₂ from asphalt of m.p. 100.degree.. Complete soly. of the materials was obsd. in aromatic and naphthenic hydrocarbons in chlorinated hydrocarbons, and in some aldehydes, aliphatic hydrocarbons, ketones, ethers, amines, heterocyclic compds., mercaptans, and nitro compds. In other solvents the soly. varied within wide limits.

L3 ANSWER 53 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1945:16922 CAPLUS

DOCUMENT NUMBER: 39:16922

ORIGINAL REFERENCE NO.: 39:2648a-e

TITLE: Asphaltic molding composition

INVENTOR(S): Sorem, Stanley S.

PATENT ASSIGNEE(S): Shell Development Co.

DOCUMENT TYPE: Patent

LANGUAGE: Unavailable

PATENT NO. KIND DATE APPLICATION NO. DATE

US 2366657 19450102 US

AB Asphaltic crude oils or cracked residues are subjected to distn., pptn. or oxidation to produce intermediate asphalts, m. above 300.degree.F. Distd. or pptd. asphalts may be further oxidized to increase their melting temp., by blowing them with air at 450-500.degree.F. Thereafter they are comminuted at a temp. below 150.degree.F. to a 20-mesh or finer particle size. The comminuted material is treated with a selective solvent for petrolenes but not asphaltenes, such as natural gasoline, n-hexane, isopentane, or pentane with isopentane or isopentane fractions as the preferred solvent. The treatment may be carried out to dissolve only a portion of the petrolenes present or an equil. is established between the solvent and the asphalt particles; thus a larger portion of petrolenes is extd. The insol. portion is sepd. from the ext. and dried. A small amt., 1-5%, of an oily substance, such as distn. residues freed of components b. below 600.degree.F., is mixed with the dried asphalt powder to form a moldable and plastic compn. m. 700-50.degree.F., of a penetration less than 1 and contg. less than 5% by wt. of volatile components by the A.S.T.M. method D6-39T. It is sol. in CS₂, pyridine, CHCl₃, and benzene, and consists of asphaltenes 75-98 and petrolenes 25-2%. This product may be used as a substitute for drying-oil resin in brakeshoes, clutch faces, and the like where the heat of friction causes the material to become rubberlike; this increases the friction coefficient of the brakeshoe. It may also be used as extinguisher for incendiary bombs, and as a thermoplastic moldable material.

L3 ANSWER 54 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1935:46421 CAPLUS

DOCUMENT NUMBER: 29:46421

ORIGINAL REFERENCE NO.: 29:6036i,6037a-c

TITLE: Paraffinic petroleum asphalt

AUTHOR(S): Muller, J.; von Pilat, S.

SOURCE: Asphalt und Teer, Strassenbautechnik (1934), 34, 649-54

CODEN: ATSB AO; ISSN: 0365-7566

DOCUMENT TYPE: Journal

LANGUAGE: Unavailable

AB cf. C. A. 27, 4899. "Asphaltene" micelles are to blame for poor ductility of asphalts obtained in retort distn. of paraffinic Boryslav petroleum. The partial removal of asphaltene micelles by pptn. with petroleum naphthas of increasing sp. gr. showed that the ductility increases greatly to a limit and then decreases and that the penetrability decreases. "Asphaltenes" pptd. by heavy naphtha from soft asphalts (16%) are nearly all sol. in C₆H₆; those from hard asphalt (22%) are insol. Increasing soly. in a series of solvents (ether, C₆H₆, CS₂ and pyridine) follows the order of the surface tension. No "asphaltenes" were pptd. from ductile asphalt obtained from the same petroleum in tube stills. Addn. of (5-10%) "asphaltenes" decreased ductility and penetrability with increasing amt., depending on the manner of dispersion and fineness. Addn. of "asphaltene" solvent (e. g., naphthalene, 2-10%) increased the ductility of asphalt but lowered the softening temp. and increased the penetrability, the optimum concn. being 7.5%. Highly ductile asphalts that are not ductile at 0.degree. acquired ductility at 0.degree. on the addn. of naphthalene.

L3 ANSWER 55 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1931:41594 CAPLUS

DOCUMENT NUMBER: 25:41594

ORIGINAL REFERENCE NO.: 25:4696f-g

TITLE: Solubility of asphalt bitumen and asphaltenes in mixed solvents

AUTHOR(S): Nellensteijn, F. J.

SOURCE: Chemisch Weekblad (1931), 28, 313-4

CODEN: CHWEAP; ISSN: 0009-2932

DOCUMENT TYPE: Journal

LANGUAGE: Unavailable

AB Dispersed asphaltenes go into soln. if a diluent is added which is completely miscible with the dispersing medium and the protective agent and which has a surface tension greater than 24-6 dynes/cm. at 25.degree. Et₂O (.sigma.25.3 16.7) ppts. asphaltenes; PhNH₂ (.sigma.25 42) is not completely miscible with the paraffin-oil medium. In a mixt. (1:1), a Mexican asphalt dissolved completely. A mixt. of petroleum ether and benzyl acetate (3:5) gave similar results, but a mixt. of Et₂O and AcOCH₂Ph was less suitable as a solvent. N.'s rule for prerequisites of mixed solvents may be applied to the solubilization of cellulose esters and other plastics.

L3 ANSWER 57 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1925:24282 CAPLUS

DOCUMENT NUMBER: 19:24282

ORIGINAL REFERENCE NO.: 19:3158f-i,3159a-b

TITLE: Petroleum asphalts and petroleum tars

AUTHOR(S): Sakhanov, A. N.

SOURCE: Neftjanoe i slancevoe Chozjajstvo (1924), 7, 933-53

From: Chem. Zentr. 1925, I, 1828-9

DOCUMENT TYPE: Journal

LANGUAGE: Unavailable

AB In agreement with Marcusson, asphalts and tars can be subdivided into neutral tars, asphaltogen acids and their anhydrides and asphaltenes. The present work deals with asphaltenes. Detns. of the asphaltene content showed 0.25% for a paraffin-free Grosny petroleum, higher values for a few samples of mazout and 32.3% for a solid tar oil. The asphaltenes which were obtained from the various products had the same properties, compn. and d. of 1.145. They contained 85.5% C, 6.8% H and 7.7% O + S. Even blowing air for 12-24 hrs. through tar oil at 350.degree. did not alter the compn. or properties of the asphaltene, though the amt. increased from 13.7 to 32.3%. The asphaltenes are sol. in aromatic hydrocarbons, CHCl_3 , CCl_4 and petr.-ether. Swelling accompanies the dissolution of asphaltenes and culminates in the transformation of the hard brittle asphaltene into a viscous, tough mass. Asphaltenes are lyophilic colloids in comparison with aromatic hydrocarbons, terpenes, halogen derivs. of hydrocarbons, CS_2 and petroleum tars. Accordingly these colloidal solns. are highly dispersed and stable and are comparable to solns. of gelatin in H_2O . Neutral asphalts and tars are colloidal solns. of asphaltenes in tars and heavy oils. The soln. of asphaltene in solvents is accompanied by the liberation of heat. The heat of soln. of asphaltene in PhMe and in CHCl_3 is about 10 cal. per g. In relation to CH_4 -hydrocarbons and naphthenes, asphaltenes are lyophobic. Rubber is a protective colloid in relation to asphaltene and it considerably inhibits its flocculation. The coagulation of asphaltene is reversible. The relation between asphaltene and petroleum depends upon the content of lyophilic and of lyophobic substances. In cases where the lyophobic components predominate, such as in Russian petroleum and in mazout, petroleum and its products dissolve very little asphaltene, though they may contain the latter in a roughly dispersed condition. An anomalous behavior was found with California and Mexican petroleum and tar because of their high tar content, which is lyophilic to asphaltene. The slight soly. of asphaltene in light petroleum fraction is due to the presence of other lyophilic solvents and to aromatic hydrocarbons. On coagulation asphaltene rapidly adsorbs tar, and this adsorption has a profound influence on the properties of the resulting asphaltene. The soft asphalts of Holde are asphaltenes which have adsorbed or dissolved small or large quantities of tar. To sep. the adsorbed tar from the asphaltene, a second pptn. is necessary after preliminary soln. in the smallest possible vol. of C_6H_6 or CHCl_3 . The best pptg. agent for asphaltene is petr.-ether, in relation to which asphaltene is strongly lyophobic. The ppt. obtained is redissolved and pptd. to free it of adsorbed tar, and often this pptn. must be repeated further. This process serves for the sepn. of difficultly sol. paraffins from the asphaltene, which occasionally ppt. with the latter. If this purification is incomplete, the asphaltene must be washed with boiling EtOH or with petr.-ether to remove the paraffin completely.

L3 ANSWER 58 OF 58 CAPLUS COPYRIGHT 2004 ACS on STN

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TITLE: Method for the Determination of the Asphalt Content of Mineral Oils, Petroleum Pitch and Similar Materials

AUTHOR(S): Schwarz, F.

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AB Reports a series of expts. using butanone instead of acetone as prescribed in the official German methods. Butanone is a good solvent for mineral oil distillates, and is not used in same manner for their sepn. as acetone; the ready solubility of light mineral oils in butanone renders it advantageous for sepn. of asphalt out of dark mineral oils. On treating asphaltic mineral oils at room temp. with the solvent, large amts. of light oil are dissolved, while black, very viscous to soft pitch masses, according to nature of material, remain undissolved; a sharp sepn. of the asphalt from the oil could not be obtained by this treatment, but on heating the butanone to boiling (81.degree.), clear dark solns. were obtained. Butanone has power to absorb a significant amt. of water, causing a lowering of solvent power and a more perfect sepn. of asphaltic substances. 1 l. butanone at room temp. requires about 110 cc. water for satn.; at 20.degree. the waterfree material has sp. gr. = 0.805, satd. with water = 0.835. Tests were made on cylinder oils using butanone-water mixt. of 0.835 and of 0.812, the latter dissolving all oils and giving a clean, sharp sepn. from asphaltic matter. Detns. were made for comparison by the alc.-ether and normal benzine methods. Results by the butanone and alc.-ether methods with some samples agreed very well, but with others there was a variation due to nature of asphaltic matter, soft asphaltic substances being dissolved in greater amt. by latter and hard substances less by former. With normal benzine, the results showed that with increasing content of butanone-insol. asphalt, there was increase in the pptn. by benzine, with a darker coloring of the benzine soln.; larger amts. of asphalt are pptd. with butanone than with benzine. Expts. were made on solid bitumens (Trinidad asphalt, soft Italian asphalt, Galiz.). Butanone is superior to usual solvents for sepn. of asphaltene from petroleum in that no chem. change is liable to take place in constituents from overheating and in that solvent power may be varied by varying additions of water, rendering it possible to sep. the asphalt into a series of characteristic constituents. An accurate study of the latter should contribute to the knowledge of the chem. nature of asphalts and the role of S in the formation and use of same. Water-free butanone as a substitute for alc.-ether in detn. of paraffin in ceresin and of paraffin in mineral oils is suggested. For paraffin detn. in oils, a single pptn. (cooling of the butanone soln. in ice-salt mixture and filtration at -15.degree.) seps. total paraffin.